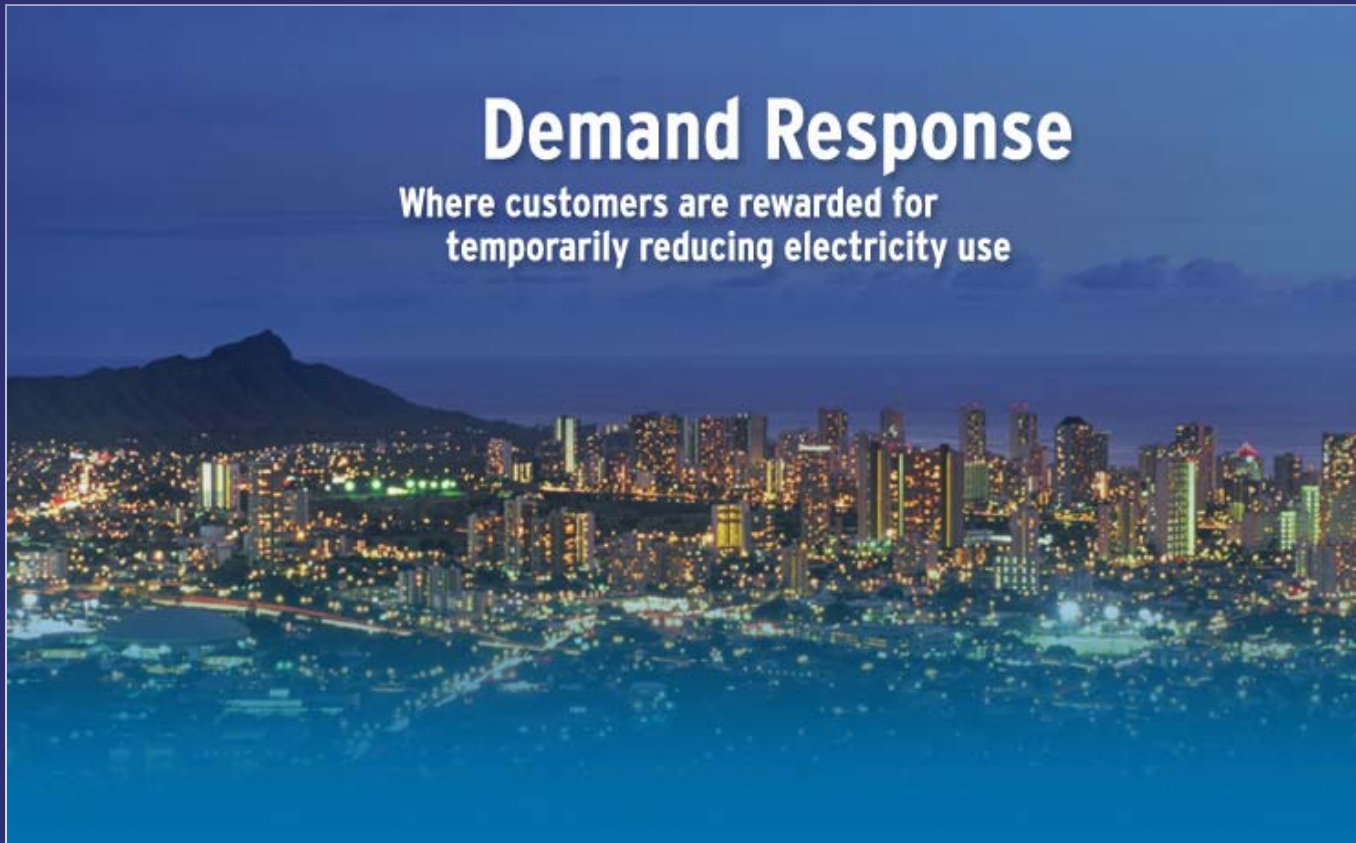


# Hawaiian Electric Company

## Demand Response

Where customers are rewarded for temporarily reducing electricity use



**Hawaiian  
Electric**

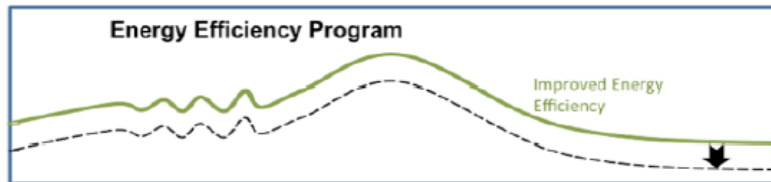
# Agenda

- ◆Intro to Demand Response (DR)
- ◆Hawaiian Electric DR Programs
- ◆DR Case Study
- ◆Benefits of DR
- ◆References

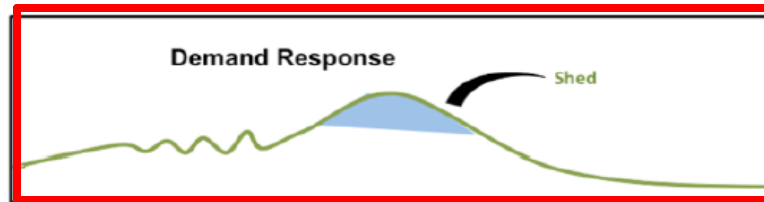
# Demand Response + Energy Efficiency



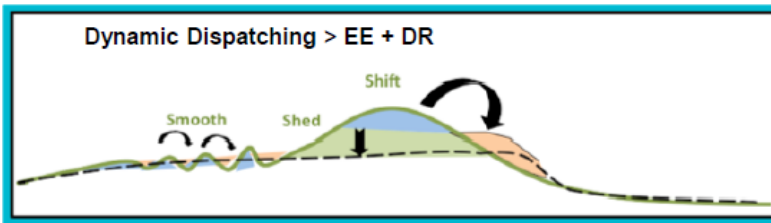
Energy Efficiency Program



Demand Response

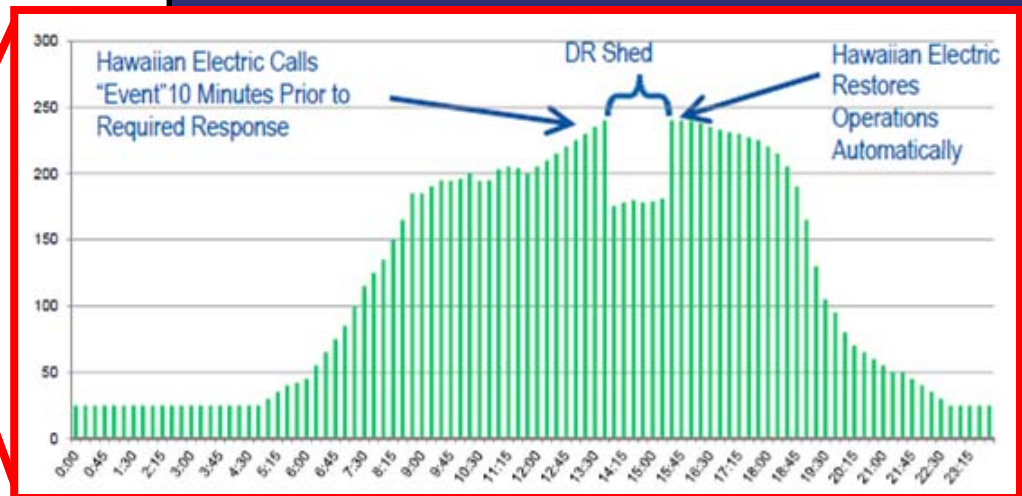


Dynamic Dispatching > EE + DR



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Courtesy of: Integral Analytics, Inc. and the Power Shift Atlantic Project

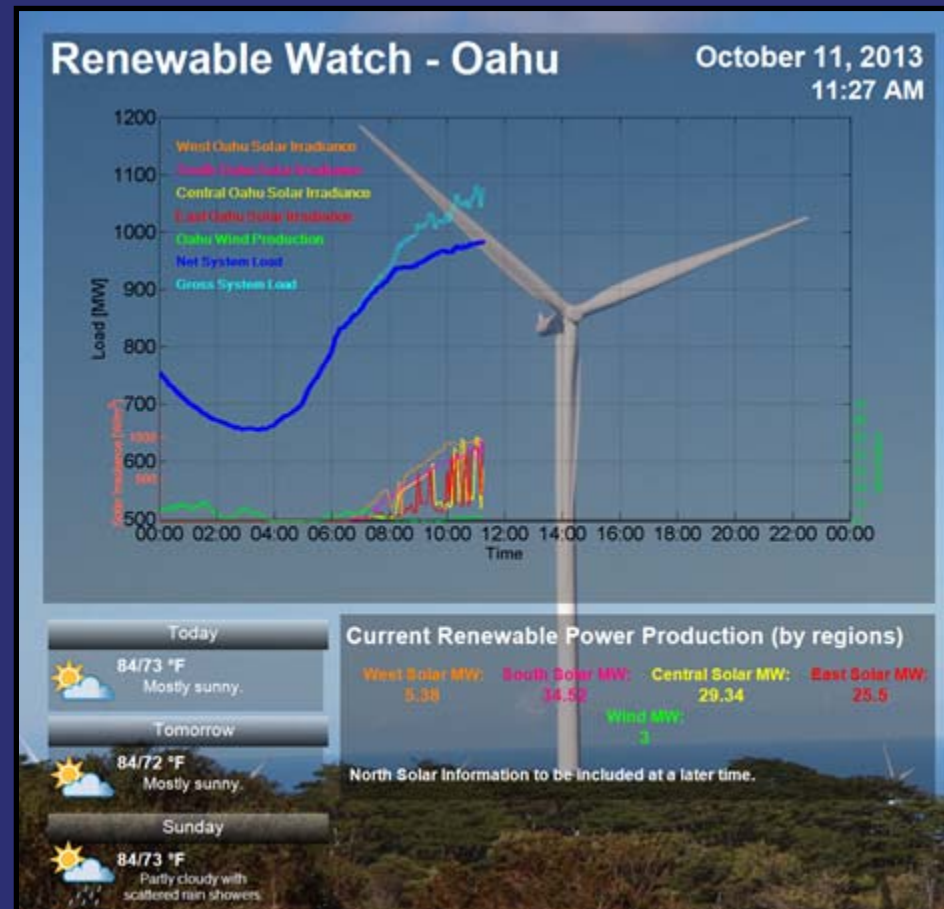


**Demand Response (DR)** is a partnership between the customer and the utility company, in which the customer reduces demand (or electricity use) in response to requests from the utility. In return, the utility compensates the customer for temporarily reducing electricity use.



# Balancing the Grid

- ◆ Defer building new fossil fuel generation
- ◆ Avoid start-up of costly generators
- ◆ System emergencies
- ◆ Frequency stabilization
- ◆ Integration of renewable resources



# Hawaiian Electric DR Programs

## Commercial

### Large

#### Customer Count

80

#### Load

22 MW

#### Launched

2004

### Small & Medium

#### Customer Count

200

#### Load

1 MW

#### Launched

2008

## Residential

### Water Heater

#### Customer Count

34,000

#### Load

14 MW

#### Launched

2005

### Central A/C

#### Customer Count

4,000

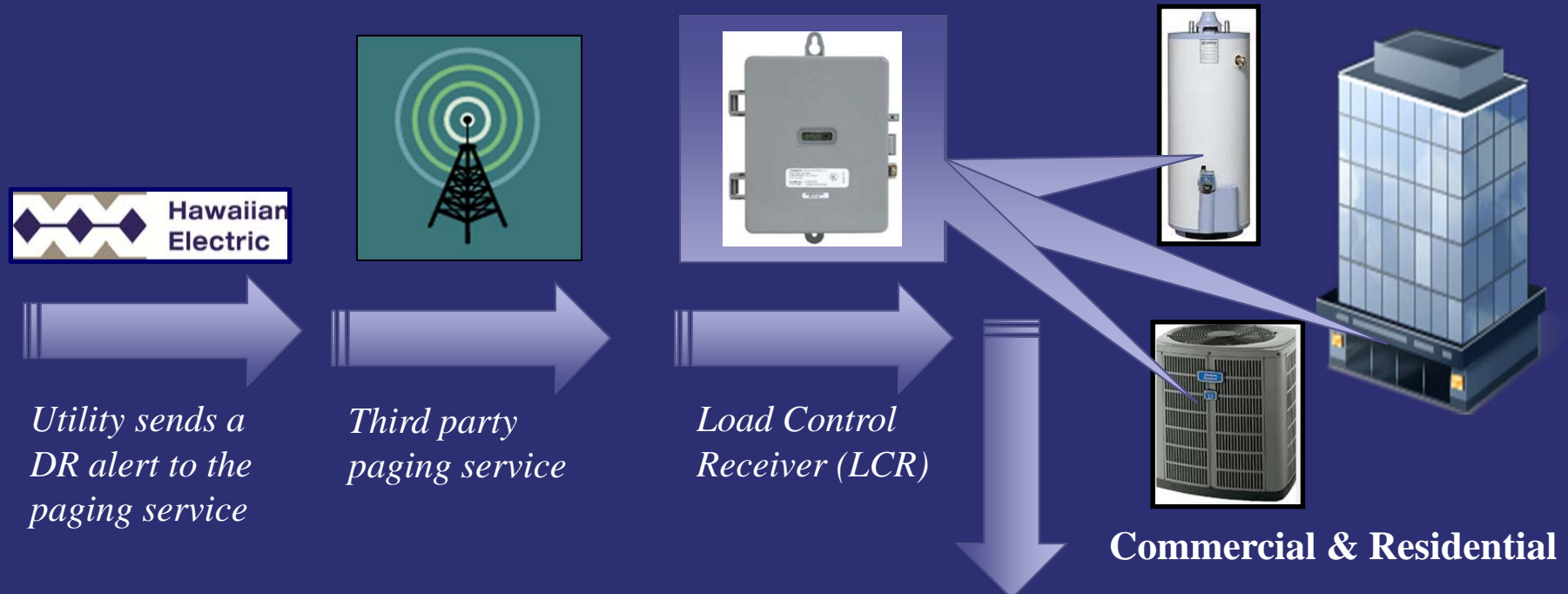
#### Load

3 MW

#### Launched

2007

# Legacy DR Program Architecture



## Large Business:

- EMS
- ATS
- Lighting

## Residential:

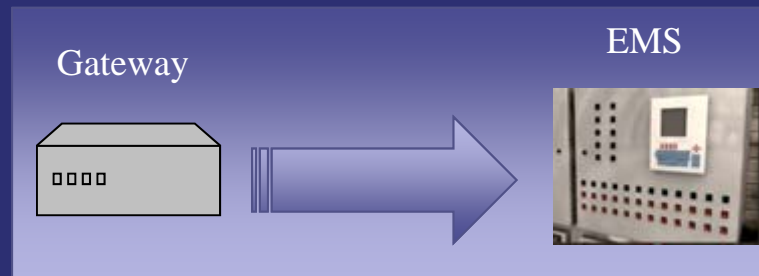
- Turn off water heaters
- Cycle Central A/C
- Increase t-stat by 2 degrees\*
- Turn on and off water heaters\*
- Switch off Plug in wall A/C units\*

\*Future initiatives

# Commercial DR Program Architecture



*Utility sends alert  
to alert via Internet*



*OpenADR 2.0b  
gateway device  
retrieves the alert*

*Facility's EMS  
carries out the  
predetermined  
directives*



Types of shed strategies being implemented:

- Raise set point on A/C units
- Shut down supply and exhaust fans
- Reduce VFD speeds or cycle AHU's
- Shut down heat pumps, pool pumps, and fountain equipment
- Demand limit or shut down chiller plant
- Reset chilled water supply temperature
- Shut off water pumps or waste water plant

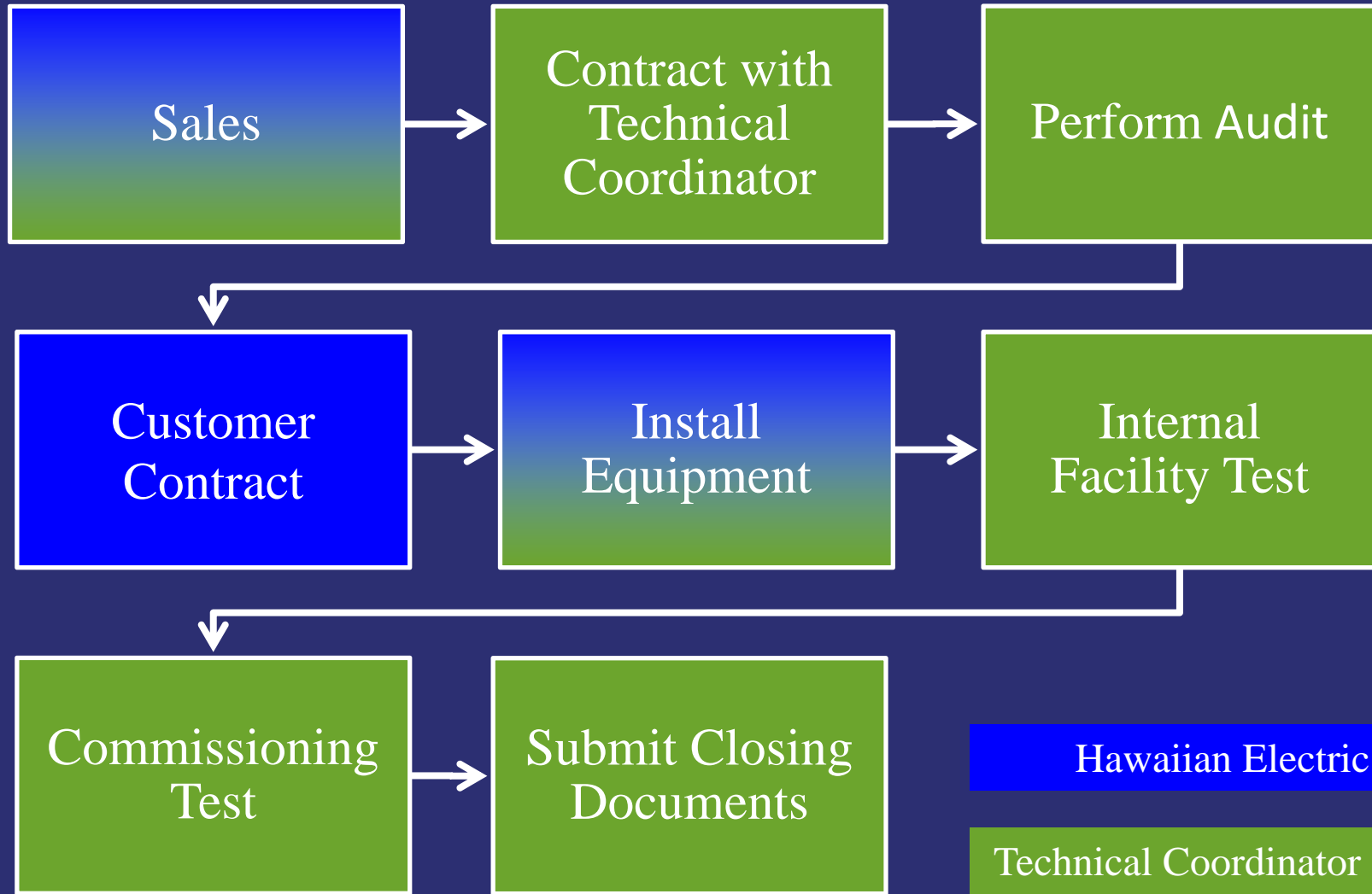
# DR Case Study

- ◆ Enrollment process
- ◆ Upgrades & equipment installation
- ◆ Architecture
- ◆ Testing
- ◆ Benefits of DR





# Commercial DR Process



# DR Case Study



## Results of Audit

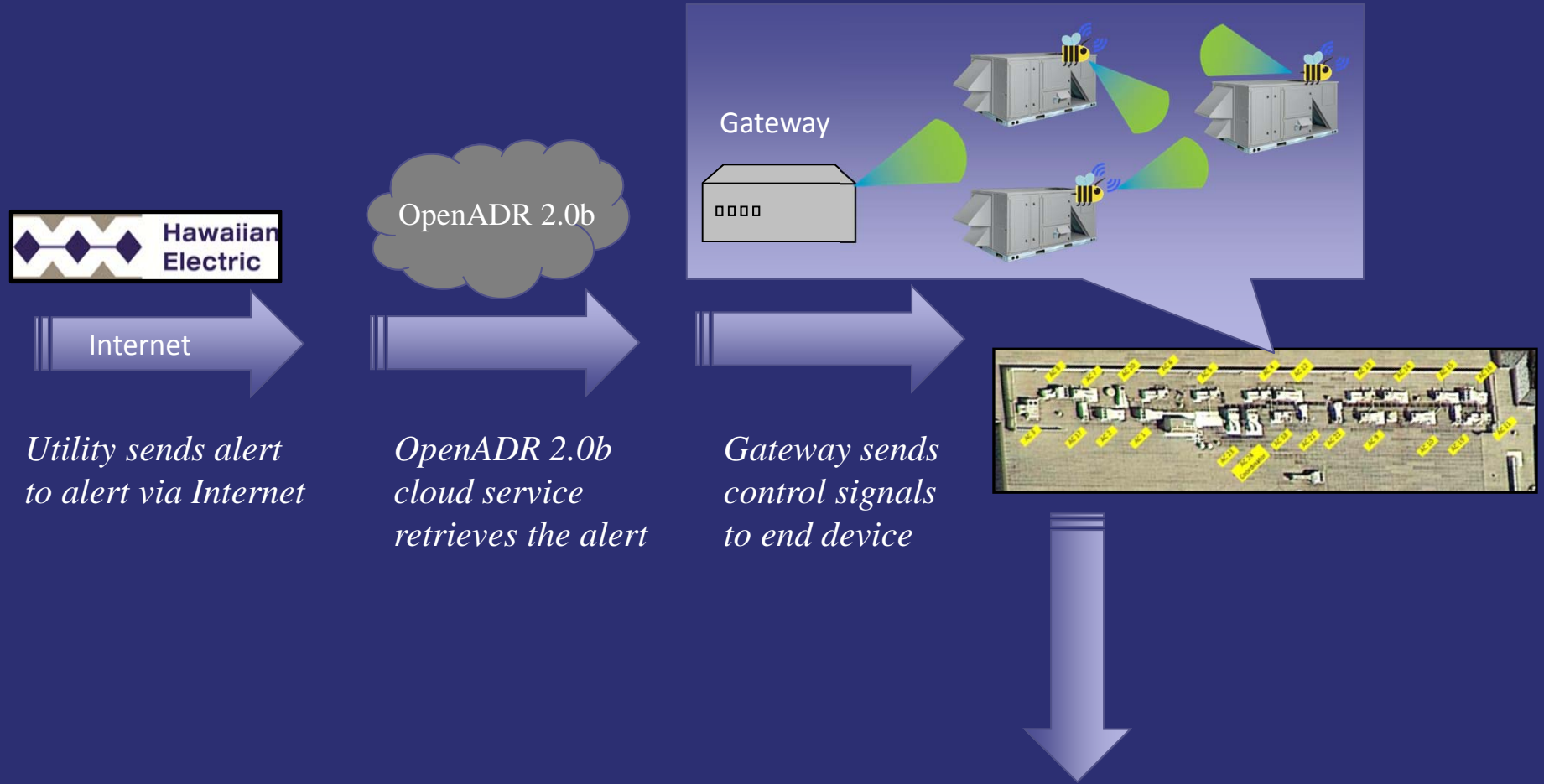
- ◆ Available Load: 60kW
- ◆ Load Type: 262 tons of cooling across 25 packaged HVAC units
- ◆ Estimated costs

## Equipment Installation

- ◆ TC: Regen Energy
- ◆ 25 Controllers
- ◆ 1 OpenADR gateway
- ◆ Install Ethernet for communication to gateway
- ◆ Install telephone line for whole building meter data

# DR Case Study

Courtesy of: Regen Energy, Inc.



Internet

OpenADR 2.0b

Gateway

*Utility sends alert to alert via Internet*

*OpenADR 2.0b cloud service retrieves the alert*

*Gateway sends control signals to end device*



Shed strategy: Cycle 25 package units

# DR Case Study



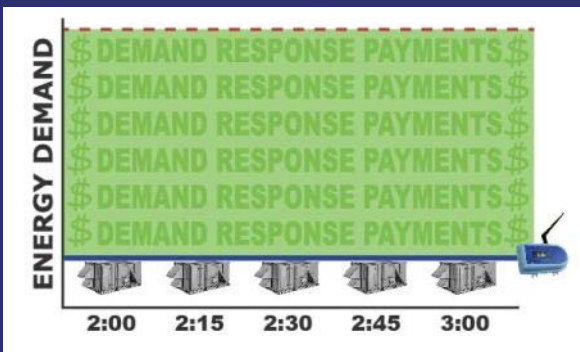
- 1-hour event
- 60 kW reduction
- 50% reduction of HVAC
- No customer concerns



Traditional Method

Swarm Logic Method

Auto DR Event



Courtesy of: Regen Energy, Inc.

# DR Case Study

## TC Costs

TC cost to perform audit

TC cost to manage installation\*

Cost of control vendor upgrade

Cost for sub-contractors

## TC Reimbursements

TC cost to perform audit

TC cost to manage installation

Cost of control vendor upgrade

Cost for sub-contractors

## Customer Costs

Monthly subscription

## Customer Rebates & DR Incentives

Hawaii Energy Rebate

DR Incentives\*\*

*\*No cost since control vendor was the TC*

*\*\*Incentives amounts depend on the on average performance per month*

# Benefits of DR

## Technical Coordinator

- Reduces cost to your customer
- Leverage customer relationship
- Leverage vendor partnerships
- Experience in DR enablement

## Equipment Vendor

- Monthly subscription by customer
- Reduces cost to the customer

## Utility

- Grid Reliability
- Integration of renewables
- Leader in the DR

## Customer

- Energy Efficiency
- Equipment upgrade
- Incentive payments
- Meter data
- Other rebates



# References

Website: <http://dr.heco.com>

Email: [energyscout@heco.com](mailto:energyscout@heco.com)

**Hawaiian Electric**

**DR** Demand Response

Customer Login

**AutoDR**  
Automatic Fast DR Customer

**Semi AutoDR**  
Manual Fast DR Customer

**Energy Scout**  
Large Business or Residential Customer

Home Overview Residential **Business** FAQ Contact Us

Open ADR: [www.openadr.org](http://www.openadr.org)

# Questions?



**Hawaii  
Electric**



**Thank you!**



**Hawaii  
Electric**